

Pressure Acclimation Investigations to Support Biological Index Testing

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All fish passing through a hydro-turbine experience a change in pressure. The change in pressure that may be experienced covers a very broad range from small to large. Previous investigations of the effect of rapid decompression on physostomous fish have not considered the state of buoyancy of test fish at depth equivalent pressures other than atmospheric. In our study, prior to exposure to changes in pressure that simulate those experienced during turbine passage, we permit juvenile Chinook being held at depth equivalent pressure greater than atmospheric access to air so that they can achieve neutral buoyancy. During this holding period, test fish are also provided the opportunity to acclimate to total dissolved gas supersaturation conditions. Results of exposure to pressure changes during simulated turbine passage are expressed as the probability of mortal injury as a function of the log transformed ratio of acclimation pressure to simulated turbine passage pressure nadir (log ratio P). The derivation of mortal injury and log ratio P variables will be presented. Results obtained to date show that for hatchery and river run subyearling and yearling Chinook the probability of mortal injury increases with increasing log ratio P. These results also indicate that for subyearling Chinook that hatchery fish may be used as surrogates for river run fish to investigate the effects of rapid decompression.

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